WATER APPENDIX

INTRODUCTION

This appendix contains in-depth information for water resources and management in the planning area. Information includes groundwater wells and impaired waterbodies in the planning area.

GROUNDWATER WELLS IN THE PLANNING AREA

See Table 1 for information on common groundwater aquifers in the planning area. See Chapter 3, *Affected Environment*, for further information.

IMPAIRED WATERBODIES IN THE PLANNING AREA

The Clean Water Act requires the Montana Department of Environmental Quality (MDEQ) to report to the United States Environmental Protection Agency (USEPA) the condition and trend of waterbodies of the state. In particular, the report examines the use classification, the actual uses, and the ability of the waterbody to support that actual use. If the beneficial use is not supported or only partly supported because of water quality impairment, the sources and possible causes are listed in Montana's *Water Quality Integrated Report* (MDEQ 2012a). Impaired waterbodies have one or more impaired beneficial uses (Water Quality Categories 4A, 4B, 4C, and 5) and may or may not require a total maximum daily load (TMDL) for various reasons.

THE 303(d) LIST

Section 303(d) of the Federal Clean Water Act and Title 40, part 130 of the Code of Federal Regulations (CFR) requires that all states develop a list of waters that do not meet water quality standards. The 303(d) list is a subset (waterbodies with Water Quality Category 5) of all waterbodies listed in Montana's comprehensive *Water Quality Integrated Report*. Waterbodies on the 303(d) list have one or more impairments caused by a pollutant and require a TMDL to be completed and approved by the USEPA. See Tables 2 and 3 for information on impaired waterbodies adjacent to BLM-administered surface within the planning area.

BENEFICIAL USES

The more common uses for surface waters within the planning area include agricultural, warm-water fisheries, primary contact recreation (swimming and other activities), and aquatic life. Drinking water and cold-water fisheries are uncommon but important uses in the area. Each of these uses will have its own water quality requirements and, if water quality is impaired, that particular waterbody may not support these uses.

IMPAIRMENT CAUSES

Impairment causes can include specific inorganic and organic compounds, suspended solids, dissolved solids, pH, vegetation alteration, habitat alteration, flow alterations, and water temperature (Table 4).

PROBABLE SOURCES OF IMPAIRMENT

Many causes can have several probable sources of impairment. Assigning probable sources is tentative and depends upon the association of impairment causes and the geographical setting. The most frequent sources of impairment in the planning area are natural sources, unknown sources, and irrigated crop production (Table 5).

TABLE 1.
GROUNDWATER WELL AQUIFER USE BY COUNTY

Geologic Source	Big Horn[1]	Carter	Custer	Daniels	Dawson	Fallon	Garfield	McCone	Powder River	Prairie	Richland	Roosevelt	Rosebud	Sheridan	Treasure	Valley	Wibaux	Total
Alluvium (Holocene)	21	3	3	2	72	19			4	5	86	1	17		253	1	2	489
Alluvium (Quaternary)[2]	237	110	27	60	258	18	1	83	90	236	410	363	254	66	4	436	19	2,672
Amsden group	1				1			1				2	7		1			13
Anderson Coal of the Fort Union formation	36								1					1				38
Anderson-Dietz 1 and 2 Coals - Fort Union– formation	14													1				15
Anderson-Dietz 1 Coals Combined - Fort Union– formation	13								1									14
Bearpaw shale	17				1		3					1	7		7	6		42
Canyon Coal of the Fort Union formation	16								6				1					23
Coal Mine Spoil Banks	22												70	1				93
Dietz 1 and 2 Coals Combined - Fort Union– formation	14													1				15
Dietz 2 Coal of the Fort Union formation	18																	18
Dietz Coal of the Fort Union formation	24								1				2					27
Eagle sandstone	16					7			3	1			2					29
Fort Union formation	69	10	24	351	394	491	34	69	30	372	429	416	40	475		113	542	3,859
Fox Hills-Hell Creek Aquifer[2]	1	7	15	4	87	231	25	21	10	150	63	23	3	6	26	87	51	810
Hell Creek formation[2]	49	313	5	28	506	270	26	30	12	54	25	141	51	9		95	53	1,667
Judith River formation (of Montana group)	37		4	2	2	19	4	4	2	1		7	61	1	24	207	4	379

TABLE 1.
GROUNDWATER WELL AQUIFER USE BY COUNTY

Geologic Source	Big Horn[1]	Carter	Custer	Daniels	Dawson	Fallon	Garfield	McCone	Powder River	Prairie	Richland	Roosevelt	Rosebud	Sheridan	Treasure	Valley	Wibaux	Total
Knoblock Coal of the Fort Union formation	1								4				7					12
Kootenai formation	12																	12
Lakota sandstone (of the Inyan Kara group)	4	2	1				5					1	5	4		1		23
Lance formation	10														129			139
Lance-Hell Creek Undifferentiated[2]	4		131						272				137		83			627
Madison group or limestone	15		1	1		5		2	3		3	6	2	5		3		46
Mission Canyon Limestone (of the Madison Group)	2	1		1	3	4	1		2			4	4	2		4	1	29
Muddy Sandstone member (of the Thermopolis shale)	2	2			2	1		1	4	1				1				14
Shannon Sandstone mbr. (of Cody or Steele sh)	18		2						18				1					39
Terrace Deposits (Pleistocene)[2]	46				21					7	173	16			8		1	272
Terrace Deposits (Quaternary)[2]	223				44			1	1	11	30		20			10	2	342
Tongue River member (of the Fort Union formation.)[2]	645		164	5	930	14	3	106	1,424	316	1,251		940	5	75		227	6,105
Tullock member (of the Fort Union formation)[2]	136	1	1,104		11	1	3	34	1,078	3	27		463		148	2	1	3,012
Other formations with less than 10 wells per formation	90						1	1	7				6					105
Total	**1,813**	**449**	**1,481**	**454**	**2,332**	**1,080**	**106**	**353**	**2,973**	**1157**	**2,497**	**981**	**2,100**	**578**	**758**	**965**	**903**	**20,980**

[1]Portions of some counties may be outside of the planning area. Not all wells in a county have had the geologic source code assigned.
[2]Aquifer is identified as an Underground Source of Drinking Water (USDW) as defined by the Federal Safe Drinking Water Act. These aquifers were identified in Source Water Delineation and Assessment Reports as supplying public water systems. There is insufficient data to identify aquifers that meet other criteria for delineation as USDWs.

TABLE 2.
2012 MONTANA LIST OF IMPAIRED STREAMS AND RIVERS ADJACENT TO BLM-ADMINISTERED LAND

Subbasin	Name	Location	Mi.	Mi. on BLM-administered land	Water Quality Cat.	Causes	Probable Sources	TMDL Area
Big Dry	Big Dry Creek (MT40D001-010)	Steves Fork to mouth (Fort Peck Reservoir)	99	6.0	5	Alteration in stream-side or littoral vegetative covers, ammonia (un-ionized), nitrate, nitrogen (total), phosphorus (total)	Agriculture, municipal point source discharges	Big and Little Dry
Big Muddy	Big Muddy Creek (MT40R001_010)	North corner of Fort Peck Reservation boundary to mouth (Missouri River)	82	0.4	5	Alteration in stream-side or littoral vegetative covers, low flow alterations, nitrogen (total), phosphorus (total), sedimentation/siltation	Agriculture, grazing in riparian or shoreline zones, impacts from hydrostructure flow regulation/ modification	Lower Missouri
Charlie-Little Muddy	Charlie Creek (MT40S004_010)	East and Middle Charlie Creek to mouth (Missouri River)	33	0.7	5	Fish-passage barrier, iron, nitrogen (total), specific conductance	Crop production (cropland or dryland), highways, roads, bridges, infrastructure (new construction), natural sources	Lower Missouri
Charlie-Little Muddy	Missouri River (MT40S003_010)	Poplar River to North Dakota border	92	25.5	5	Other flow regime alterations, temperature (water)	Dam or impoundment, impacts from hydrostructure flow regulation/ modification	Lower Missouri
Fort Peck Reservoir	Nelson Creek (MT40E003-020)	Headwaters to mouth (Big Dry Creek arm of Fort Peck Reservoir)	36	0.6	5	Alteration in stream-side or littoral vegetative covers, cadmium, copper, nitrates, nitrogen (total), phosphorus (total), sulfates, total dissolved solids (TDS)	Agriculture, grazing in riparian or shoreline zones, source unknown	Redwater
Fort Peck Reservoir	Timber Creek (MT40E003_010)	Headwaters to mouth (Big Dry Creek arm of Fort Peck Reservoir)	89	6.8	4A	Nitrogen (total), Total Kjeldahl Nitrogen (TKN), phosphorus (total)	Agriculture, natural sources, source unknown	Redwater
Little Powder	Little Powder River (MT42I001_010)	The border to mouth (Powder River)	63	1.2	5	Salinity	Natural sources, source unknown	Powder
Lower Musselshell	Musselshell River (MT40C003_010)	Flatwillow Creek to Fort Peck Reservoir	76	3.7	4C	Alteration in stream-side or littoral vegetative covers, low flow alterations	Agriculture, flow alterations from water diversions, grazing in riparian or shoreline	Lower Musselshell

TABLE 2.
2012 MONTANA LIST OF IMPAIRED STREAMS AND RIVERS ADJACENT TO BLM-ADMINISTERED LAND

Subbasin	Name	Location	Mi.	Mi. on BLM-administered land	Water Quality Cat.	Causes	Probable Sources	TMDL Area
							zones, impacts from hydrostructure flow regulation/ modification, impacts from resort areas (winter and non-winter resorts), streambank modifications/ destabilization	
Lower Powder	Powder River MT42J003_011	Little Powder River to Mizpah Creek	99	4.5	5	Salinity	Natural sources, source unknown	Powder
Lower Powder	Powder River MT42J003_012	Mizpah Creek to mouth (Yellowstone River)	45	1.6	5	Salinity	Natural sources, source unknown	Powder
Lower Powder	Stump Creek MT42J004_010	Headwaters to mouth (Powder River)	30	3.6	5,2B	Salinity	Natural sources	Powder
Lower Tongue	Otter Creek (MT42C002_020)	Headwaters to mouth (Tongue River)	108	0.5	5,2B	Alteration in stream-side or littoral vegetative covers, iron, salinity, solids (suspended/bedload)	Agriculture, grazing in riparian or shoreline zones, highways, roads, bridges, infrastructure (new construction), natural sources, site clearance (land development or redevelopment)	Tongue
Lower Tongue	Pumpkin Creek (MT42C002_061)	Headwaters to Little Pumpkin Creek	88	<0.1	5	Low flow alterations, salinity, temperature (water)	Irrigated crop production, natural sources	Tongue
Lower Tongue	Pumpkin Creek (MT42C002_062)	Little Pumpkin Creek to the mouth (Tongue River)	92	8.4	5	Low flow alterations, salinity, temperature (water)	Irrigated crop production, natural sources	Tongue
Lower Tongue	Tongue River (MT42C001_011)	Twelve Mile Dam to mouth (Yellowstone River)	21	3.6	5	Cadmium, copper, iron, lead, low flow alterations, nickel, salinity, solids (suspended/bedload), sulfates, zinc	Dam construction (other than upstream flood control projects), impacts from hydrostructure flow regulation/ modification, irrigated crop production, natural	Tongue

TABLE 2.
2012 MONTANA LIST OF IMPAIRED STREAMS AND RIVERS ADJACENT TO BLM-ADMINISTERED LAND

Subbasin	Name	Location	Mi.	Mi. on BLM-administered land	Water Quality Cat.	Causes	Probable Sources	TMDL Area
							sources, streambank modifications/ destabilization	
Lower Tongue	Tongue River (MT42C001_013)	Hanging Woman Creek to Beaver Creek	75	0.5	5	Iron, low flow alterations, solids (suspended/bedload)	Impacts from hydrostructure flow regulation/ modification, natural sources, irrigated crop production, streambank modifications/ destabilization	Tongue
Lower Yellowstone	Burns Creek (MT42M002_110)	Headwaters to mouth (Yellowstone River)	54	0.2	5	Chlorophyll-a, fish-passage barrier, iron, nitrogen (total), other flow regime alterations, phosphorus (total), solids (suspended/bedload)	Crop production (crop land or dry land), hydrostructure impacts on fish passage, irrigated crop production, natural sources	Lower Yellowstone
Lower Yellowstone	Cabin Creek (MT42M002_150)	Headwaters to mouth (Yellowstone River)	103	9.7	5	Nitrogen (total), oxygen (dissolved), sedimentation/siltation	Dam or impoundment, natural sources, rangeland grazing	Lower Yellowstone
Lower Yellowstone	Cedar Creek (MT42M002_141)	26 miles upstream to mouth (Yellowstone River)	27	17.6	5	Alteration in stream-side or littoral vegetative covers, arsenic, copper, iron, lead	Grazing in riparian or shoreline zones, natural sources, spills from trucks or trains	Lower Yellowstone
Lower Yellowstone	Cedar Creek (MT42M002_142)	26 to 45 miles above the mouth	20	2.5	5,2B	Copper, iron, lead, selenium	Natural sources	Lower Yellowstone
Lower Yellowstone	Cottonwood Creek (MT42M002_100)	Headwaters to mouth (Yellowstone River)	22	1.0	5	Cadmium, fish-passage barrier, iron, physical substrate habitat alterations	Channelization, flow alterations from water diversions, hydrostructure impacts on fish passage, natural sources, source unknown	Lower Yellowstone
Lower Yellowstone	Fox Creek (MT42M002_051)	Headwaters to mouth (Yellowstone River), T22N R59E S19	50	0.8	5	Arsenic, excess algal growth, iron, lead, low flow alterations, mercury, nitrogen (total), phosphorus (total), physical	Channelization, irrigated crop production, natural sources, source	Lower Yellowstone

TABLE 2.
2012 MONTANA LIST OF IMPAIRED STREAMS AND RIVERS ADJACENT TO BLM-ADMINISTERED LAND

Subbasin	Name	Location	Mi.	Mi. on BLM-administered land	Water Quality Cat.	Causes	Probable Sources	TMDL Area
						substrate habitat alterations, solids (suspended/bedload), sulfates, TDS	unknown	
Lower Yellowstone	Glendive Creek (MT42M002_130)	Headwaters to mouth (Yellowstone River)	56	1.4	5	Alteration in stream-side or littoral vegetative covers, cadmium, chromium (total), copper, iron, lead, nickel, selenium, solids (suspended/ bedload), zinc	Grazing in riparian or shoreline zones, natural sources, source unknown	Lower Yellowstone
Lower Yellowstone	O'Brien Creek (MT42M002_060)	State line to mouth (Yellowstone River)	16	0.1	5	Excess algal growth, nitrate/nitrite (nitrite + nitrate as N), selenium	Animal feeding operations (nonpoint source), irrigated crop production	Lower Yellowstone
Lower Yellowstone	Smith Creek (MT42M002_080)	Headwaters to mouth (Yellowstone River)	45	0.9	4C	Fish-passage barrier	Low water crossing	Lower Yellowstone
Lower Yellowstone	Yellowstone River (MT42M001_011)	Lower Yellowstone Diversion Dam to North Dakota border	54	5.5	5	Alteration in stream-side or littoral vegetative covers, chromium (total), copper, fish-passage barrier, lead, nitrogen (total), pH, phosphorus (total), sedimentation/ siltation, TDS	Impacts from hydrostructure flow regulation/ modification, irrigated crop production, natural sources, source unknown, rangeland grazing, streambank modifications/ destabilization,	Yellowstone River
Lower Yellowstone	Yellowstone River (MT42M001_012)	Powder River to Lower Yellowstone Diversion Dam	77	23.9	4C	Fish-passage barrier	Dam construction (other than upstream flood control projects)	Yellowstone River
Lower Yellowstone-Sunday	Deadman Creek (MT42K002_060)	Headwaters to mouth (North Fork Sunday Creek)	17	3.5	5	Nitrogen (total), phosphorus (total)	Source unknown	Middle Yellowstone Tributaries
Lower Yellowstone-Sunday	East Fork Armells Creek (MT42K002_110)	Colstrip to mouth (Armells Creek)	32	0.6	5	Nitrate/nitrite (nitrite + nitrate as N), nitrogen (total), specific conductance, TDS	Agriculture, coal mining, transfer of water from an outside watershed	Middle Yellowstone Tributaries
Lower Yellowstone-Sunday	Harris Creek (MT42K002_020)	Headwaters to mouth (Yellowstone River)	27	6.4	5	Chlorophyll-a, other flow regime alterations, phosphorus (total), solids (suspended/ bedload)	Grazing in riparian or shoreline zones, livestock (grazing or feeding operations),	Middle Yellowstone Tributaries

TABLE 2.
2012 MONTANA LIST OF IMPAIRED STREAMS AND RIVERS ADJACENT TO BLM-ADMINISTERED LAND

Subbasin	Name	Location	Mi.	Mi. on BLM-administered land	Water Quality Cat.	Causes	Probable Sources	TMDL Area
							natural sources, transfer of water from an outside watershed	
Lower Yellowstone-Sunday	Little Porcupine Creek (MT42K002_160)	Headwaters to mouth (Yellowstone River)	119	1.1	5	Chlorophyll-a, nitrate/nitrite (nitrite + nitrate as N), nitrogen (total), phosphorus (total), TDS	Rangeland grazing, source unknown	Middle Yellowstone Tributaries
Lower Yellowstone-Sunday	Muster Creek (MT42K002_040)	Headwaters to mouth (Yellowstone River)	31	1.1	5	Chlorophyll-a, nitrate/nitrite (nitrite + nitrate as N), other flow regime alterations, phosphorus (total), solids (suspended/bedload)	Irrigated crop production, transfer of water from an outside watershed	Middle Yellowstone Tributaries
Lower Yellowstone-Sunday	North Fork Sunday Creek (MT42K002_080)	Custer/ Rosebud County border to mouth (Sunday Creek)	34	0.3	5	Sedimentation/siltation, sodium, solids (suspended/bedload), specific conductance, TDS	Channelization, crop production (cropland or dryland), natural sources	Middle Yellowstone Tributaries
Lower Yellowstone-Sunday	Stellar Creek (MT42K002_070)	Headwaters to mouth (Little Porcupine Creek)	43	5.2	5	Cadmium, chlorophyll-a, pH, phosphorus (total)	Rangeland grazing, source unknown	Middle Yellowstone Tributaries
Lower Yellowstone-Sunday	Sunday Creek (MT42K002_030)	The North and South Forks to mouth (Yellowstone River)	15	0.1	5	Chlorophyll-a, copper, iron, lead, nitrate/nitrite (nitrite + nitrate as N), nitrogen (total), phosphorus (total), physical substrate habitat alterations, TKN	Irrigated crop production, natural sources, non-irrigated crop production, rangeland grazing, source unknown	Middle Yellowstone Tributaries
Lower Yellowstone-Sunday	Yellowstone River (MT42K001_020)	The Big Horn to Cartersville Diversion Dam	59	4.7	4C	Fish-passage barrier	Dam construction (other than upstream flood control projects)	Yellowstone River
Lower Yellowstone-Sunday	Yellowstone River (MT42K001_010)	The Cartersville Diversion Dam to Powder River	89	8.6	5	Alteration in stream-side or littoral vegetative covers, copper, lead, pH, nitrate/nitrite (nitrite + nitrate as N), solids (suspended/bedload), TDS, zinc	Agriculture, irrigated crop production, municipal point source discharges, natural sources, post-development erosion and sedimentation, rangeland grazing, source unknown, streambank modifications/ destabilization	Yellowstone River
Middle Musselshell	Musselshell River (MT40C001-010)	HUC boundary near Roundup to Flatwillow	48	3.3	4C	Alteration in stream-side or littoral vegetative covers, low	Agriculture, channelization,	Upper/ Middle

TABLE 2.
2012 MONTANA LIST OF IMPAIRED STREAMS AND RIVERS ADJACENT TO BLM-ADMINISTERED LAND

Subbasin	Name	Location	Mi.	Mi. on BLM-administered land	Water Quality Cat.	Causes	Probable Sources	TMDL Area
		Creek				flow alterations, physical substrate habitat alterations	impacts from hydrostructure flow regulation/ modification, streambank modifications/ destabilization	Musselshell
Middle Powder	Powder River (MT42J001_010)	Wyoming border to Little Powder River	78	7.9	5	Salinity	Natural sources, source unknown	Powder
Mizpah	Mizpah Creek (MT42J005_011)	Headwaters to Corral Creek	132	1.7	5	Salinity	Natural sources	Powder
Mizpah	Mizpah Creek (MT42J005_012)	Corral Creek to the mouth (Powder River)	23	0.5	5	Salinity	Natural sources	Powder
O` Fallon	Pennel Creek (MT42L001_010)	Headwaters to mouth (O'Fallon Creek)	66	10.8	5	TDS	Source unknown	O` Fallon
O` Fallon	Sandstone Creek (MT42L001_020)	Headwaters to mouth (O'Fallon Creek)	73	2.5	5	Nitrate/nitrite (nitrite + nitrate as N), nitrogen (total)	Agriculture, municipal point source discharges	O` Fallon
Porcupine	Porcupine Creek (MT40O003_010)	Confluence of West and Middle Forks to mouth (Milk River)	49	0.4	5	Nitrogen (total), phosphorus (total), salinity	Non-irrigated crop production	Lower Milk
Prairie Elk-Wolf	Missouri River (MT40S001_012)	Milk River to Poplar River	82	1.8	5	Alteration in stream-side or littoral vegetative covers, other flow regime alterations, temperature (water)	Impacts from hydrostructure, flow regulation/ Modification, loss of riparian habitat	Lower Missouri
Prairie Elk-Wolf	Prairie Elk Creek (MT40S002_010)	East and Middle Forks to mouth (Missouri River)	39	0.6	4A	Alteration in stream-side or littoral vegetative covers, nitrogen (total), phosphorus (total), physical substrate habitat alterations, TKN	Agriculture, grazing in riparian or shoreline zones	Redwater
Prairie Elk-Wolf	Sand Creek (MT40S002_030)	Confluence of East and West Forks to mouth (Missouri River)	20	0.5	5	Nitrogen (total), phosphorus (total), physical substrate habitat alterations, sedimentation/ siltation, TKN	Agriculture, non-irrigated crop production, rangeland grazing	Redwater
Redwater	East Redwater Creek (MT40P002_010)	Headwaters to mouth (Redwater River)	51	0.4	5	Chlorophyll-a, nitrate/nitrite (nitrite + nitrate as N), nitrogen (total), phosphorus (total), sedimentation/siltation, specific conductance, sulfates, TDS, TKN	Agriculture, source unknown	Redwater

TABLE 2.
2012 MONTANA LIST OF IMPAIRED STREAMS AND RIVERS ADJACENT TO BLM-ADMINISTERED LAND

Subbasin	Name	Location	Mi.	Mi. on BLM-administered land	Water Quality Cat.	Causes	Probable Sources	TMDL Area
Redwater	Redwater River (MT40P001_014)	Pasture Creek to mouth (Missouri River)	60	3.1	4C	Alteration in stream-side or littoral vegetative covers, physical substrate habitat alterations	Natural sources, rangeland grazing	Redwater
Rosebud	Rosebud Creek (MT42A001_012)	Northern Cheyenne Reservation boundary to an irrigation dam 3.8 mi above the mouth	112	<0.1	5	Other	Dam construction (other than upstream flood control projects)	Rosebud
Upper Little Missouri	Little Missouri River (MT39F001_021)	Highway 323 bridge to South Dakota border	61	0.7	5	Cadmium, copper, iron, lead, zinc	Natural sources, source unknown	Little Missouri
Upper Little Missouri	Little Missouri River (MT39F001_022)	Wyoming border to the Highway 323 bridge	45	1.0	5	Cadmium, copper, lead, nitrogen (total), phosphorus (total), zinc	Agriculture, natural sources, source unknown	Little Missouri
Upper Little Missouri	Thompson Creek (MT36F001_010)	Wyoming border to mouth (Little Missouri River)	41	0.1	5,2B	Cadmium, copper, iron, zinc	Natural Sources	Little Missouri
Upper Tongue	Hanging Woman Creek (MT42B002_032)	Wyoming border to Stroud Creek	31	0.3	5,2B	Low flow alterations, salinity	Irrigated crop production, natural sources	Tongue
Upper Tongue	Tongue River (MT42B001_020)	Tongue River Dam to Prairie Dog Creek	22	0.1	4C	Low flow alterations	Impacts from hydrostructure flow regulation/ modification, irrigated crop production, streambank modifications/ destabilization	Tongue

TABLE 3.
2012 MONTANA LIST OF IMPAIRED RESERVOIRS AND LAKES ADJACENT TO BLM-ADMINISTERED LAND

Subbasin	Name	Acres	Acres on BLM-administered land	Use Class	Water Quality Cat.	Cause	Probable Sources	TMDL Area
Upper Tongue	Tongue River Reservoir (MT42B003_010)	2,158	4.8	B-2	5	Chlorophyll-a, oxygen (dissolved), solids (suspended/bedload)	Irrigated crop production, municipal point source discharges	Tongue

TABLE 4.
CAUSES OF SURFACE WATER
IMPAIRMENT IN THE PLANNING AREA

Impairment Cause	Number of Mentions on 2012 303(d) List
Nitrogen (total)	30
Phosphorus (total)	26
Alteration in stream-side or littoral vegetative covers	24
Lead	17
Low flow alterations	17
Solids (suspended/bedload)	16
Salinity	15
Copper	14
Iron	13
Nitrate/nitrite (nitrite + nitrate as N)	13
TDS	13
Chlorophyll-a	11
Other flow regime alterations	11
Physical substrate habitat alterations	11
Sedimentation/siltation	10
Cadmium	9
Fish passage barriers	9
Mercury	7
Temperature (water)	7
TKN	7
Zinc	7
Specific conductance	6
Sulfates	5
Excess algal growth	4
Arsenic	3
E. coli	3
pH	3
Selenium	2
Chromium	2
Nickel	2
Nitrate	2
Other	2
Oxygen (dissolved)	2
Sodium	2
Ammonia	1
Biological indicators	1
Cause unknown	1
High flow regime	1
Organic enrichment (sewage)	1

TABLE 5.
PROBABLE SOURCES OF IMPAIRMENT IN THE PLANNING AREA

Probable Source	Number of Mentions on 2012 303(d) List
Natural sources	34
Source unknown	31
Irrigated crop production	30
Agriculture	16
Impacts from hydrostructure flow regulation/modification	14
Rangeland grazing	14
Grazing in riparian or shoreline zones	13
Streambank modifications/ destabilization	11
Channelization	9
Non-irrigated crop production	6
Dam or impoundment	5
Municipal point source discharges	5
Transfer of water from and, outside of, the watershed	5
Crop Production (cropland or dryland)	4
Dam construction (other than upstream flood control projects)	4
Hydrostructure impacts on fish passage	4
Flow alterations from water diversions	3
Highways, roads, bridges	3
Loss of riparian habitat	3
Animal feeding operations (nonpoint source)	2
Atmospheric deposition-toxics	2
Infrastructure (new construction)	2
Coal mining	1
Habitat modification (other than hydromodification)	1
Historic bottom deposits (not sediment)	1
Impacts from abandoned mine lands (inactive)	1
Impacts from resort areas (winter and non-winter resorts)	1
Livestock (grazing or feeding operations)	1
Low water crossings	1
On-site treatment systems (Septic systems and similar decentralized systems)	1
Post-development erosion and sedimentation	1
Site clearance (land development or redevelopment)	1
Spills from trucks or trains	1
Surface mining	1

TOTAL MAXIMUM DAILY LOAD DEVELOPMENT IN THE PLANNING AREA

In compliance with the provisions of the Montana Water Quality Act adopted by MDEQ in 2000, a new methodology was employed to develop and determine the TMDL values for waterways. This methodology was developed with the assistance of the Statewide TMDL Advisory Group. It employed a weighted scoring system, based on the 13 prioritization criteria mandated by the Montana Water Quality Act, to assign a high, moderate, or low planning priority to each waterway segment. Each planning area was then scheduled for plan development. This schedule was also compiled in response to a June 2000, United States District Court order requiring USEPA and MDEQ to adopt a schedule that would ensure the development (by May 5, 2007) of all necessary TMDLs for waterways on the 1996, 303(d) list. To avoid having two separate TMDL planning schedules in effect at the same time, MDEQ adopted a single schedule, addressing waterways appearing on either the 1996 or 2000 list, and published this schedule in the 2000 Montana 303(d) list. When the 2002 303(d) list was published, an appeal of the court order was underway and, therefore, MDEQ did not attempt a full prioritization update. Only some minor rescheduling was completed, which was permissible within the time limit of the court order.

On July 25, 2003, the United States Court of Appeals for the Ninth Circuit ruled on the USEPA's appeal of the District Court order and found that the District Court had the authority to require the USEPA and MDEQ to establish and follow a schedule for developing TMDLs but did not have the discretion to refuse permit modifications on the 1996 list of impaired waters.

The court order schedule allows flexibility for the MDEQ and USEPA to respond to contingencies as long as the pace of TMDL development is maintained. The determination of TMDLs for some planning priority areas may be delayed if others are accelerated to maintain the pace. In its 2002 update list, MDEQ made several schedule modifications. Since the publication of the 2002 list, consultations between MDEQ and USEPA have identified additional rescheduling needs and allocated lead responsibility for the development of specific TMDLs to either the MDEQ or the USEPA Montana Office. These proposed schedule modifications and workload allocations were presented for consideration by the Statewide TMDL Advisory Group on September 16, 2003. The advisory group provided positive comments on these changes and encouraged MDEQ to complete the TMDLs as quickly as possible. In 2003, the Montana State Legislature extended (by an additional 5 years) the original 10-year date for completing TMDLs for waterways appearing on the 1996 list.

During the development of the 2000, 2002, and 2004 lists, MDEQ determined that several waterways in the Tongue River, Powder River, and Little Powder River basins considered impaired on the 1996 list were actually meeting water quality standards (e.g., Mizpah Creek was found to be fully supportive for nutrients, dissolved oxygen, inorganics, and suspended solids). However, it should be noted that assessments commonly indicate that flow or habitat alterations result in high levels of pollutants; therefore, some of these waterways may require additional assessment prior to developing TMDLs for the associated TMDL planning areas. It is possible that MDEQ will determine that additional waterways have attained the standards for listed pollutants. If so, completion of a TMDL will not be required, even though the waterway and the pollutants appeared on the 1996 list. Conversely, additional TMDLs may be required if the assessment demonstrates that a waterway is impaired for other pollutants not identified on the 1996 list. The Rosebud, Tongue River, and Powder River planning priority areas are undergoing pre-TMDL planning and assessment.

This page intentionally left blank.